Implementation of an Open Source Provider and Organization Registry Service

“A generic standard compliant approach”

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Background

- (P)EHR Project in the Rhein-Neckar Region (2.5 millions inhabitants)
  - Standard based implementation (IHE, HL7, DICOM,…)
  - Strong focus on patient empowerment
  - Improve quality of diagnosis + treatment (avoid multiple examinations)
  - Today a EHR pilot is running: 1 University Hospital, 4 County Hospitals
  - PEHR implementation within the next 4 years

- Unique identification of healthcare providers essential in PEHR architecture

- Today unique identifiers are only available for billing purposes
  - Life long physician number
  - Permanent establishment number

- No central electronic repository available to use them in other systems
PEPA architecture overview
Objectives

• Implementation of an Provider an Organization Registry Service (PORS)
  – administration point for a unique identifier for healthcare providers and organizations
  – provide a healthcare provider an organization repository for EHRs
  – provide a yellow page service for patients
• Usage of open source technologies
• Release project open source at Open eHealth Foundation under Apache License 2
• IHE compliant implementation
  – IHE Actors for integration purposes
  – HL7 for communication purposes
Methods

• Architectural draft of scratch taking similar system architectures into account (e.g. Master Patient Index)
• Feasibility analysis within a software master class
• Final implementation within an internship as agile software project
  – Cooperation project with the Software Engineering and Database Systems Research Group at the Heidelberg University
  – Using scrum approach
PORS functionality

• Add, update, deactivate/reactivate provider or organization
  – via web interface
  – via communication interface (HL7, WSDL)
• Automatically assign one unique ID
• Handle any much local IDs
• Ability to link provider with organization (m to n possible)
• Import mass data via CSV File
• Duplicate recognition and matching via record linkage
• Query or export a provider or organization list (e.g. for a yellow page service)
Technical environment

• Implementation as web-service using service-orientated architecture
  – Application server: JBoss 6
  – Database: PostgreSQL 8 + embedded duplicate recognition
  – Persistence engine: Hibernate
  – Search engine: Apache Lucene

• Message interface using
  – HL7 V2 Messages
  – SOAP with WSDL
HL7 messages used

• **Master File Notification Message (MFN^M02^MFN_M02)**

  ```
  MSH|~\&|SAP-ISH^sapr3t^002|UKHD^0999|PORS|UKHD|20110728130601||MFN^M02^MFN_M02|987654321|P|2.5.1
  MFI|PRO^Provider^UKHD0001||UPD|||AL
  MFE|MAD|||12345|PL
  STF|12345|179999900|Beckenbauer^Franz^Jun.^Dr|Internist|M|19501101|A||
  54321|^PORS&1.2.276.0.76.3.1.78.1.0.10.30&ISO|00496221566736^00496221562000^franz@beckenbauer.de|
  Musterstraße 14^Musterhausen^12345^DE|20091211
  ```

• **Master File Query by Parameter (QBP^Q81^QBP_Q21)**

  ```
  MSH|~\&|SAP-ISH^sapr3t^002|UKHD^0999|PORS|UKHD|20110728130601||QBP^Q81^QBP_Q21|987654321|P|2.5.1
  QPD|Q81^Find Provider^UKHD0002|987654321|@STF.3.1.1^Beckenbauer
  RCP|I|10^RD
  ```

• **Segment Pattern Response (RSP^K25^RSP_K25)**

  ```
  MSH|~\&|SAP-ISH^sapr3t^002|UKHD^0999|PORS|UKHD|20110728130601||RSP^K25^RSP_K25|987654321|P|2.5.1
  MSA|CA|987654321
  QAK|1234|OK|Q81^Find Provider^UKHD0002|1|1|0
  QPD|Q81^Find Provider^UKHD0002|987654321|@STF.3.1.1^Beckenbauer
  RCP|I|10^RD
  STF|12345|179999900|Beckenbauer^Franz^Jun.^Dr|Internist|M|19501101|A||
  54321|^PORS&1.2.276.0.76.3.1.78.1.0.10.30&ISO|00496221566736^00496221562000^franz@beckenbauer.de|
  Musterstraße 14^Musterhausen^12345^DE|20091211
  ```
Comparison with IHE HPD

• IHE IT Infrastructure Technical Framework Supplement Healthcare Provider Directory (HPD)
• Available since May 24, 2010 for Public Comments
• Proposes a LDAP Schema to provide information about healthcare providers and organizations
• Advantages
  – well known implementations in large scale system architectures
  – good performance for high volume of lookups
• Disadvantages
  – no HL7 Support but EHR Systems normally use HL7
  – no duplicate recognition
Current work and outlook

• Integration into an open source demonstrator
• Performance testing and comparison with IHE Healthcare Provider Directory (HPD) Profile implementation
• First stable code release by the end of this year planed
Thank you for your attention!

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